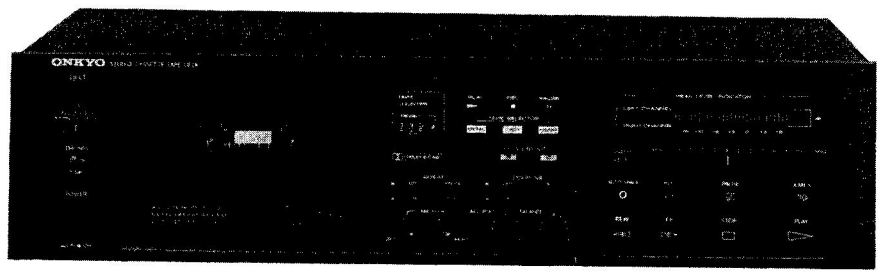
SERIAL NO. 3228

ONKYO SERVICE MANUAL

STEREO CASSETTE TAPE DECK MODEL TA-2330



Black and silver model

SAFTY-RELATED COMPONETN WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ ON THE SCHEMATIC DIAGRAM AND IN THE PARTS LIST ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE THESE COMPONENTS WITH ONKYO PARTS WHOSE PARTS NUMBERS APPEAR AS SHOWN IN THIS MANUAL.

MAKE LEAKAGE-CURRENT OR RESISTANCE MEASUREMENTS TO DETERMINE THAT EXPOSED PARTS ARE ACCEPTABLY INSULATED FROM THE SUPPLY CIRCUIT BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

ONKYO
AUDIO COMPONENTS

SPECIFICATIONS

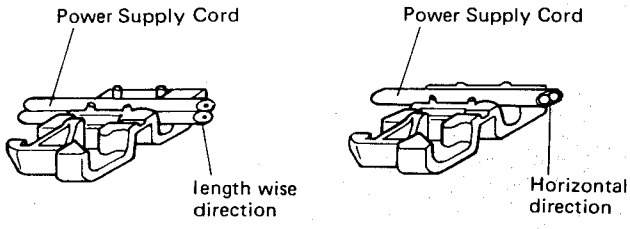
Track Format:	4 tracks, 2 channels
Erasing System:	AC erase
Tape Speed:	4.8 cm/sec. (1-7/8 i.p.s.)
Wow & Flutter:	0.06% (WRMS)
Frequency Response:	20–15,000Hz (30–14,000Hz ± 3dB) (normal position tape) 20–16,000Hz (30–15,000Hz ± 3dB) (high position tape) 20–17,000Hz (30–16,000Hz ± 3dB) (metal position tape)
Signal-to-Noise Ratio:	58dB (metal position tape, Dolby NR out) A noise reduction of 10dB above 5kHz and 5dB at 1kHz is possible with Dolby B NR. A noise reduction of 20dB at 5kHz is possible with Dolby C NR.
Input Jacks:	Mic jacks: 2 Input sensitivity: 0.6mV/600 ohms Input impedance: 2.7 kohms Line IN: 2 Input sensitivity: 60mV Input impedance: 50 kohms
Outputs:	Line OUT: 2 Std output level: 500mV (0dB) Optimum load impedance: over 50 kohms Headphone Jack: 1 Optimum load impedance: 8-200 ohms
Motors:	DC servo motor: 1 DC motor: 1
Heads:	Rec/pb head: Special Hard Permalloy Erase head: Ferrite
Power Supply:	AC120V/60Hz
Power Consumption:	19 watts
Dimensions:	435(W) x 112(H) x 257(D) mm (17-1/8" x 4-7/16" x 10-1/8")
Weight:	3.8 kg. (8.4 lbs.)

Specifications and external appearance are subject to change without notice because of product improvements.

SERVICE PROCEDURES

1. Replacement of power supply cord

There are two power supply cord outlets on the strainrelief. Insert them in prescribed direction to ensure safety. AS-UC-3 (UD<120V> model) should be inserted lengthwise and other types of cords should be inserted horizontally.

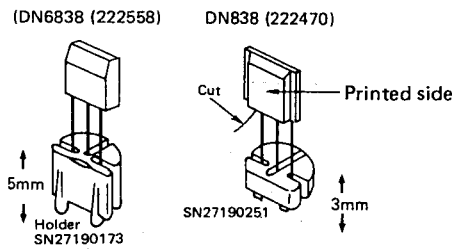


2. Instruction resistance measurement

Connect the insulating-resistance tester between the plug of power supply cord and chassis.
Specifications; 500V more than 10MΩ

3. Replacing the Hall ICs

Cautions: As the position of leg of DN6838 and DN838 differ, use the same Hall IC when replacing.



1. Mechanism

This mechanism consists of a capstan motor, reel motor, and solenoid, with the power assist method by means of the capstan motor. In the operation, there are 3 conditions: STOP, PLAY, and CUE/REV. When the position is triggered by the solenoid, by means of intermittent rotation of the gear from the flywheel, as shown in Fig. 1, cyclic shifting is done.

To go from STOP to PLAY, if the solenoid is pulled in for 30ms, after about 150ms there is a shift to the PLAY condition. From this condition, if the solenoid is again pulled in, in that interval the condition shifts to CUE/REV. However, to suppress heat generation in the solenoid, the supply voltage must be reduced. If the power to the solenoid is cut off, the head lowers, and the condition goes to STOP. In order to have a cyclic operation as stated above, and to know the existing condition, a play switch is provided, and this switch is ON for PLAY and OFF for STOP (CUE/REV) is indefinite. When power is turned ON, the mechanism makes use of an initializer.

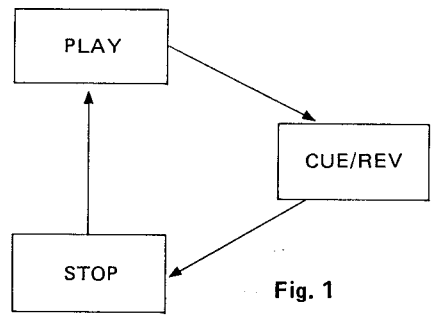
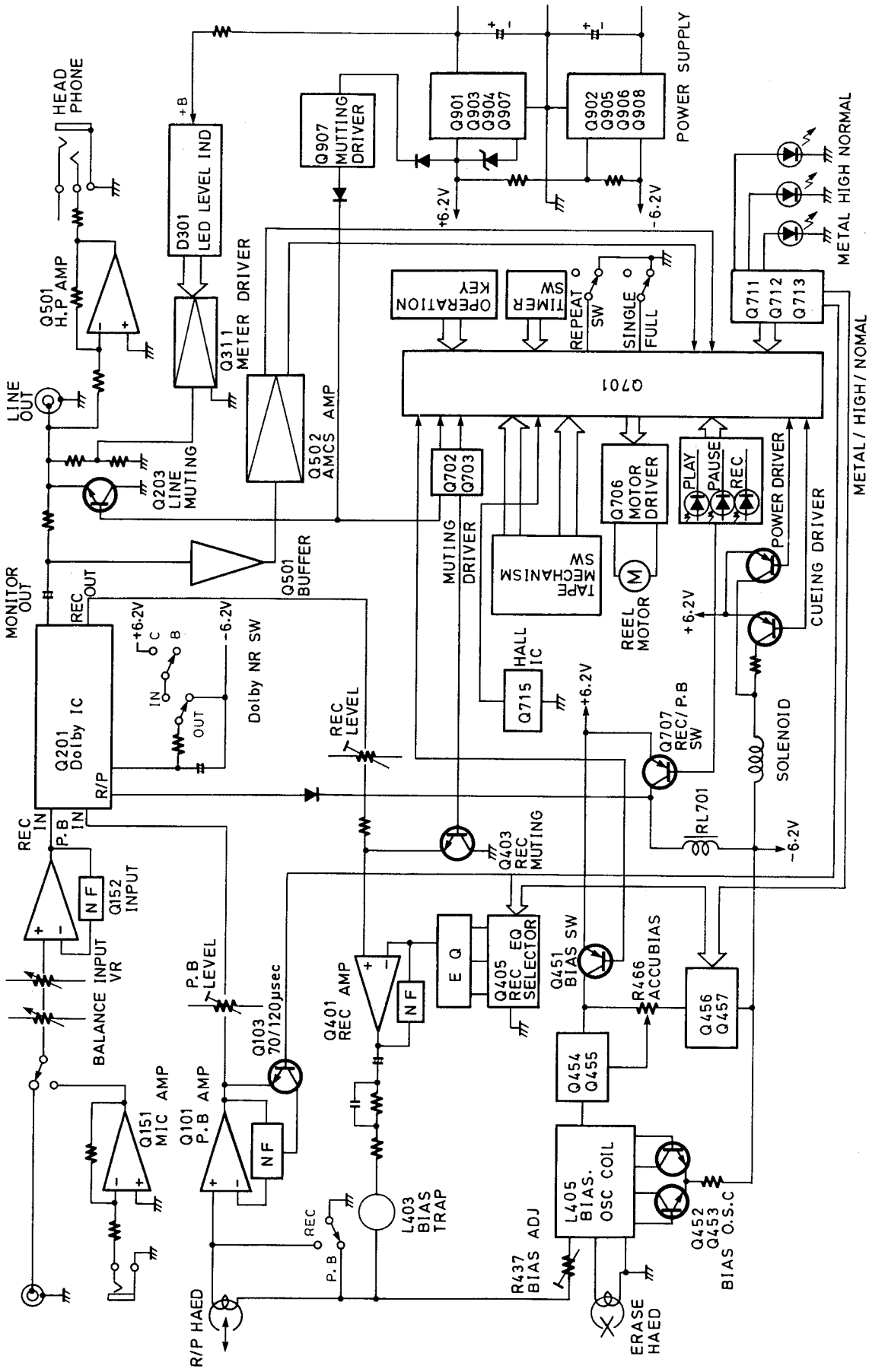


Fig. 1

BLOCK DIAGRAM



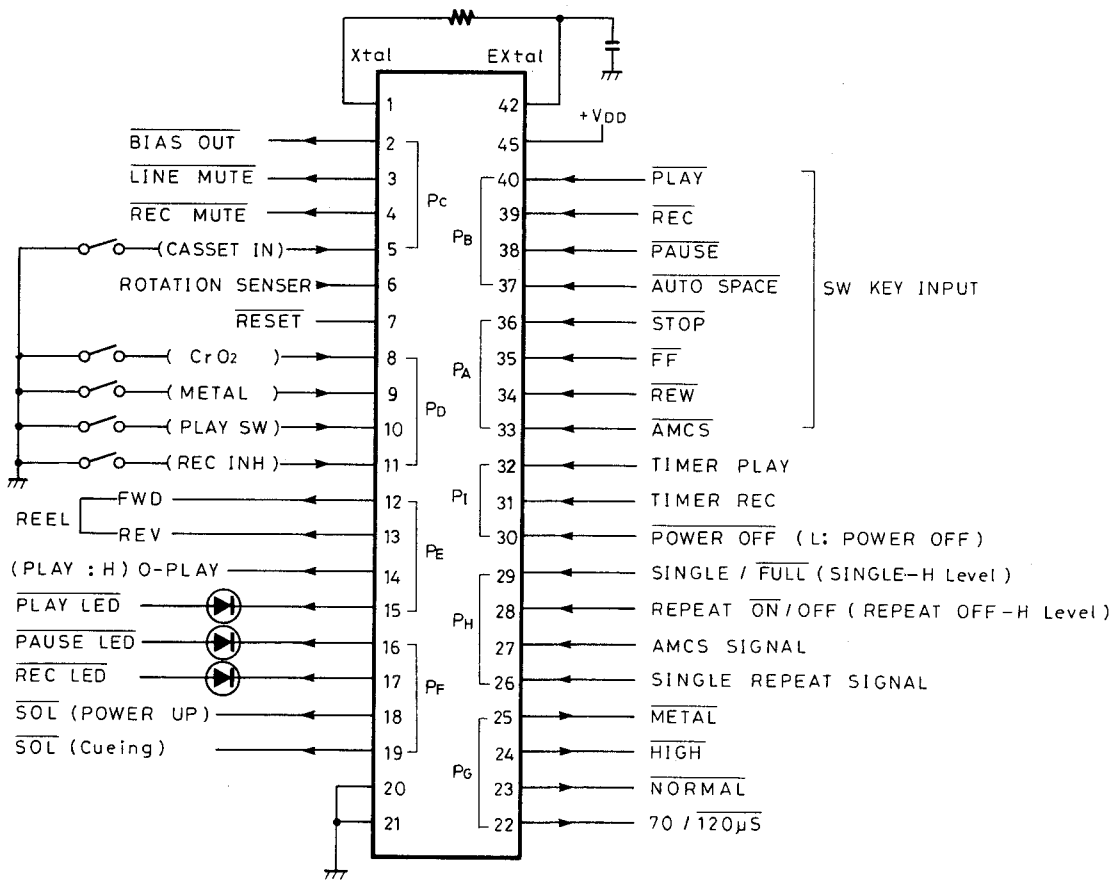
MICROCOMPUTER (LM6405L-1994)

In the microcomputer, the operating voltage is high with the NMOS type LM6502L using V_{DD} = 6V. The clock uses a condenser/resistor oscillator and is designed for a frequency of 170KHz. (Frequency measurement can be made by connection through a 100KΩ ~ 330KΩ to pin No. 1.)

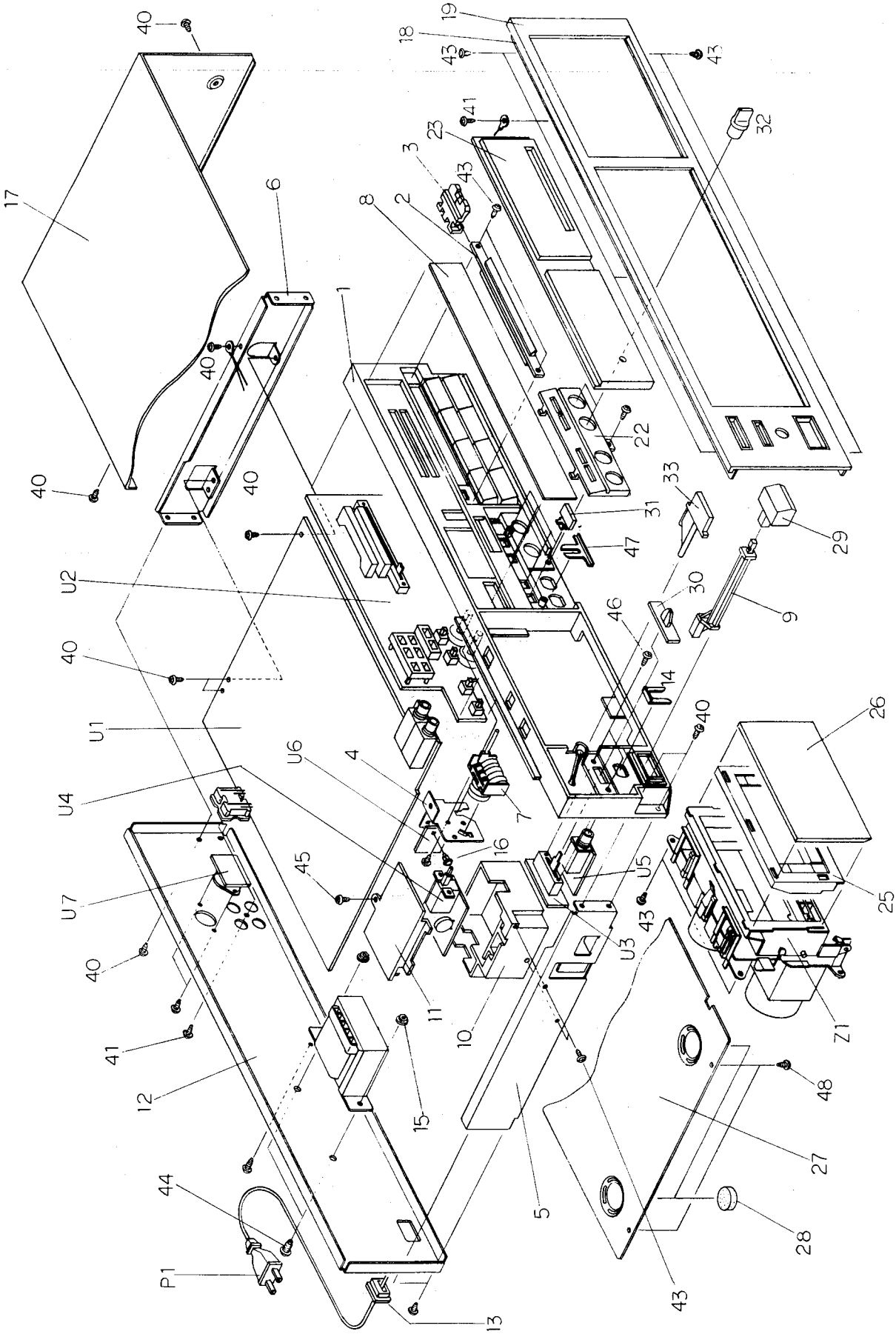
Port No.	Name	Function
1	XTAL	Connected to resistor of oscillator for clock use
2	$\overline{\text{BIAS OUT}}$	Output port for turning bias oscillator ON/OFF: Oscillation with 0 level
3	$\overline{\text{LINE MUTE}}$	Output port for line muting: Muting with 0 level
4	$\overline{\text{REC. MUTE}}$	Output port for recording muting: Muting with 0 level
5	$\overline{\text{CASSETTE IN}}$	Input for cassette loading detection: Cassette loading with 0 level
6	ROTATION SENSOR	Pulse input rotation detection
7	$\overline{\text{RESET}}$	System reset for microcomputer use
8	CrO_2	Input for automatic detection of chrome tape: Chrome use hole detection with 1 level
9	METAL	Input for automatic detection of metal tape: Metal use hole detection with 1 level
10	$\overline{\text{PLAY SWITCH}}$	Input for PLAY position detection: PLAY position with 0 level
11	REC. INH	Lug detection input for recording prevention: Disable with 1 level
12	REEL FF	Output for reel motor rotation in fast forward direction: Rotation with 1 level
13	REEL REW	Output for reel motor rotation in rewind direction: Rotation with 1 level
14	O PLAY	Reel motor rotation selection: Slow with 1 Fast with 0
15	$\overline{\text{PLAY LED}}$	LED output for PLAY indication: Lights with 0
16	$\overline{\text{PAUSE LED}}$	LED output for PAUSE indication: Lights with 0
17	$\overline{\text{REC LED}}$	LED output for REC indication: Lights with 0
18	$\overline{\text{SOL. P-UP}}$	Output for solenoid pull in: Pull in with 0
19	$\overline{\text{SOL}}$	Output for solenoid pull in hold (low power): Pull in hold with 0
20	TEST	Input for microcomputer chip inspection (Normally connected to V_{SS})
21	V_{SS}	Ground terminal
22	70 μs/$\overline{120\ \mu s}$	For input to pins 8, 9, output for play back equalizer selection
23	$\overline{\text{NORMAL}}$	For input to pins 8, 9, output for record equalizer selection (NORMAL)
24	HIGH	For input to pins 8, 9, output for record equalizer selection (HIGH)
25	METAL	For input to pins 8, 9, output for record equalizer selection (METAL)
26	SINGLE SIG.	Input for recording signal detection for single repeat when in low speed
27	AMCS SIG.	Input for recording signal detection for AMCS use when in high speed
28	REPEAT OFF/$\overline{\text{ON}}$	Input for repeat operation ON/OFF: Operates with 0
29	SINGLE/$\overline{\text{FULL}}$	Selection of SINGLE/FULL operation: Full repeat with 0

Port No.	Name	Function
30	$\overline{\text{P OFF}}$	Input for power off detection: Off with 0
31	$\overline{\text{TIMER REC}}$	Input for timer recording ON/OFF: Operates with 0
32	$\overline{\text{TIMER PLAY}}$	Input for timer play back ON/OFF: Operates with 0
33	$\overline{\text{AMCS}}$	Key input to cause AMCS operation: Operation with 0
34	$\overline{\text{REW}}$	Key input to cause rewinding: Operation with 0
35	$\overline{\text{FF}}$	Key input to cause fast forward operation: Operation with 0
36	$\overline{\text{STOP}}$	Key input to cause stop operation: Operation with 0
37	$\overline{\text{AUTO SPACE}}$	Key input to cause auto space operation: Operation with 0
38	$\overline{\text{PAUSE}}$	Key input to cause pause or recording pause: Operation with 0
39	$\overline{\text{REC}}$	Key input pushed together with PLAY key to cause recording: Operation with 0
40	$\overline{\text{PLAY}}$	Key input for play back or recording: Operation with 0
41	V_{DD}	Power source terminal
42	EXTAL	Connects to resistor and condenser of oscillator for clock

NOTE 0: Low level
1: High level



CHASSIS EXPLODED VIEW



CHASSIS EXPLODED VIEW PART LIST

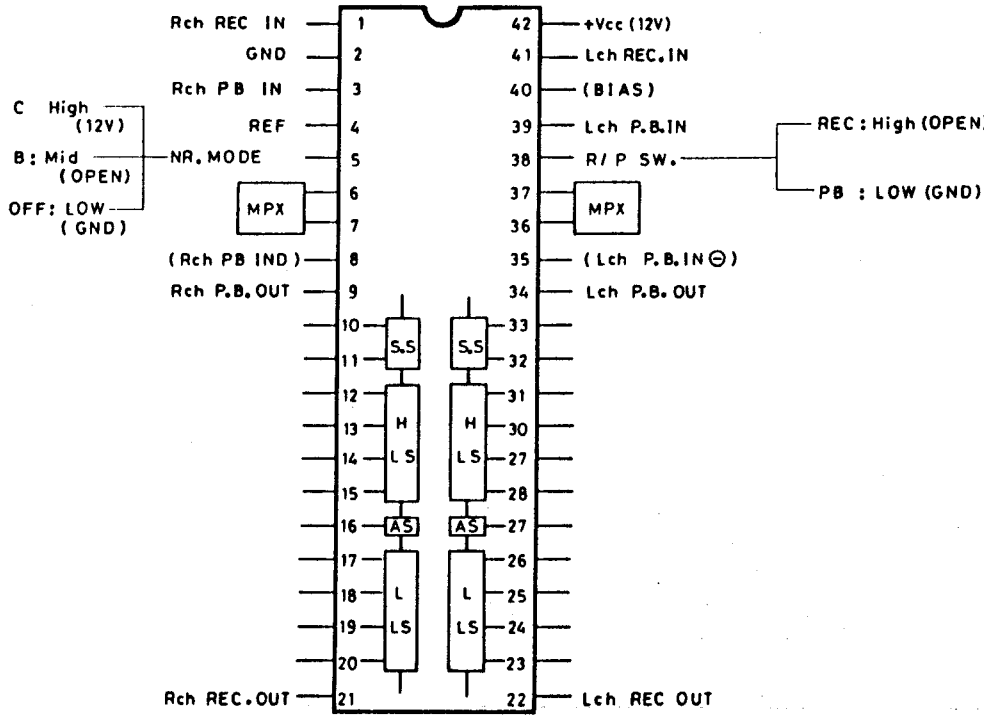
REF. NO.	PART NO.	DESCRIPTION
1	27110278A	Front bracket (S)
	27110281A	Front bracket (B)
2	27267458	Guide
3	28322508	Knob (SLIDE) ass'y
4	27141060	Bracket (C)
5	27115130E	Side bracket
6	27115169	Side bracket (R)
7	24601199	Counter
8	28133163A	Back plate
9	27273037A	Joint (L)
10	27190351A	Holder (POW)
11	27190356	Holder
12	27120834	Back bracket
13	27300750	Strainrelief
14		Stopper (1)
15	86414010	FWN4x10FN, Flangenut
16	880009	Revert
17	28184277	Top cover (S)
	28184278A	Top cover (B)
18	28194223	Decoration plate (S)
	28194224	Decoration plate (B)
19	15032121	Front panel (S)
	15042121	Front panel (B)
21	27267405A	Guide (ET) (S)
	27267408A	Guide (ET) (B)
22	28194216	Decoration (S)
	28194217	Decoration (B)
23	28191346A	Clear plate
24	27190443	Holder
25	28400269	Cassette lid
26	28191347	Window
27	27170201-1A	Bottom board
28	27175028	Leg
29	28321928-1	Knob (POW) (S)
	28321905B	Knob (POW) (B)
30	28322035	Knob (TIMER) (S)
	28322044	Knob (TIMER) (B)
31	28322507A	Knob (PUSH)
32	28322508	Knob (BAL)
33	28322509	Knob (EJ) ass'y (S)
	28322510	Knob (EL) ass'y (B)
40	834430068	3TTS+6B (BC), Screw
41	834430108	3TTS+10B (BC), Screw
42	831430088	3TT+8B (BC), Screw
43	833430080	3TT+8P (BC), Screw
44	830440109	4TTC+10C (BC), Screw
45	831430120	3TTW+12P (BC), Screw
46	82142604	2.6P+4F (BC), Screw
47		Stopper (2)
48	834430088	3TTS+8B (BC), Screw
T901 ⚠	2300094	NPT-917G, Power transformer
P1 ⚠	253129A	AS-CEE, Power supply cord
Z1	244090	NDM-82, Tape mechanism ass'y
U1	15038507-1A	NAAF-2607-1A , Main pc board ass'y
U2	15038508-1	NADIS-2608-1, Display pc board ass'y
U3	15038509-1	NASW-2609-1, Timer switch pc board ass'y
U4	15038510-1	NASW-2610-1, Power switch pc board ass'y
U5	15038511-1	NAHP-2611-1 (S)
	15038511-1A	NAHP-2611-1A (B)
		Headphone tarminal pc board ass'y
U6	15038512-1	NATD-2612-1, Hall IC pc board ass'y

NOTE: [S] : Silver model
[B] : Black model

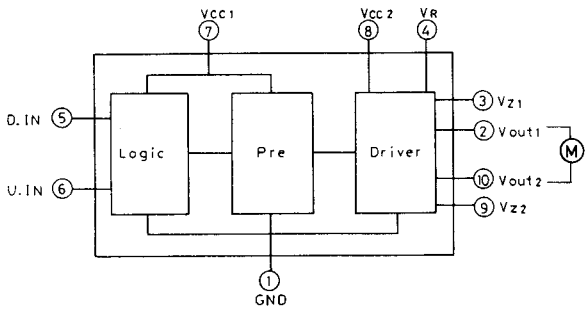
NOTE: THE COMPONENTS IDENTIFIED BY MARK ⚠ ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE ONLY WITH PARTS NUMBER SPECIFIED.

IC BLOCK DIAGRAM

HA12088NT
(DOLBY NR IC 2CH in one package)

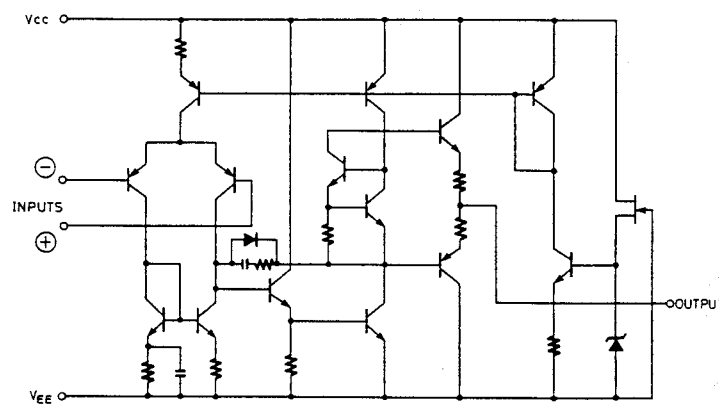


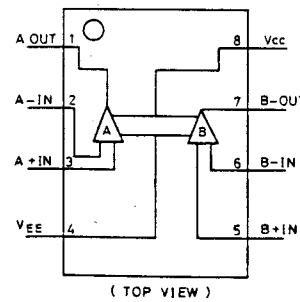
BA6229 (REEL MOTOR DRIVER)



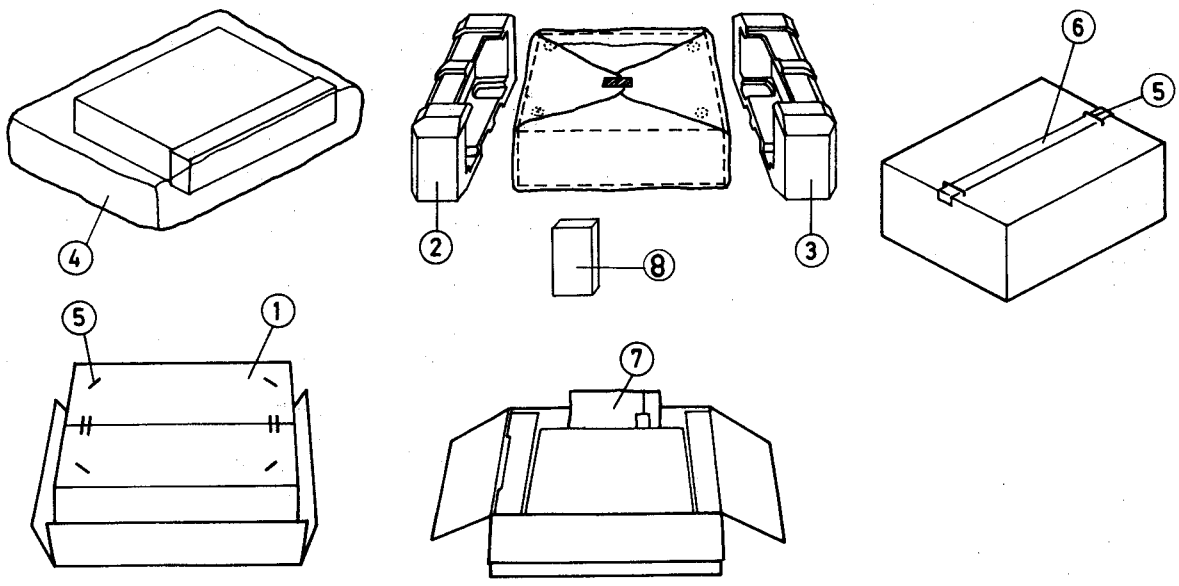
INPUT		OUTPUT		
IN1 ⑤	IN2 ⑥	OUT1 ②	OUT2 ⑩	
L	L	L	L	STOP
H	L	H	L	REV
L	H	L	H	FOW
H	H	L	L	BRAKE

NJM-2068D-D





PACKING VIEW



UGV

REF. NO.	PARTS NO.	DESCRIPTION
1	29051292	Master carton box (S)
	29051293	Master carton box (B)
2	29090987	Pad (L)
3	29090988	Pad (R)
4	29100037A	650 x 500 Poly bag
5	282301	Sealing hook
6	260012	Damplon tape
7		Accessary bag ass'y
	29340991	Instruction manual
	2010095	Connection cable
	29365016B	Waranty card
	29100006A	350 x 250 Poly bag

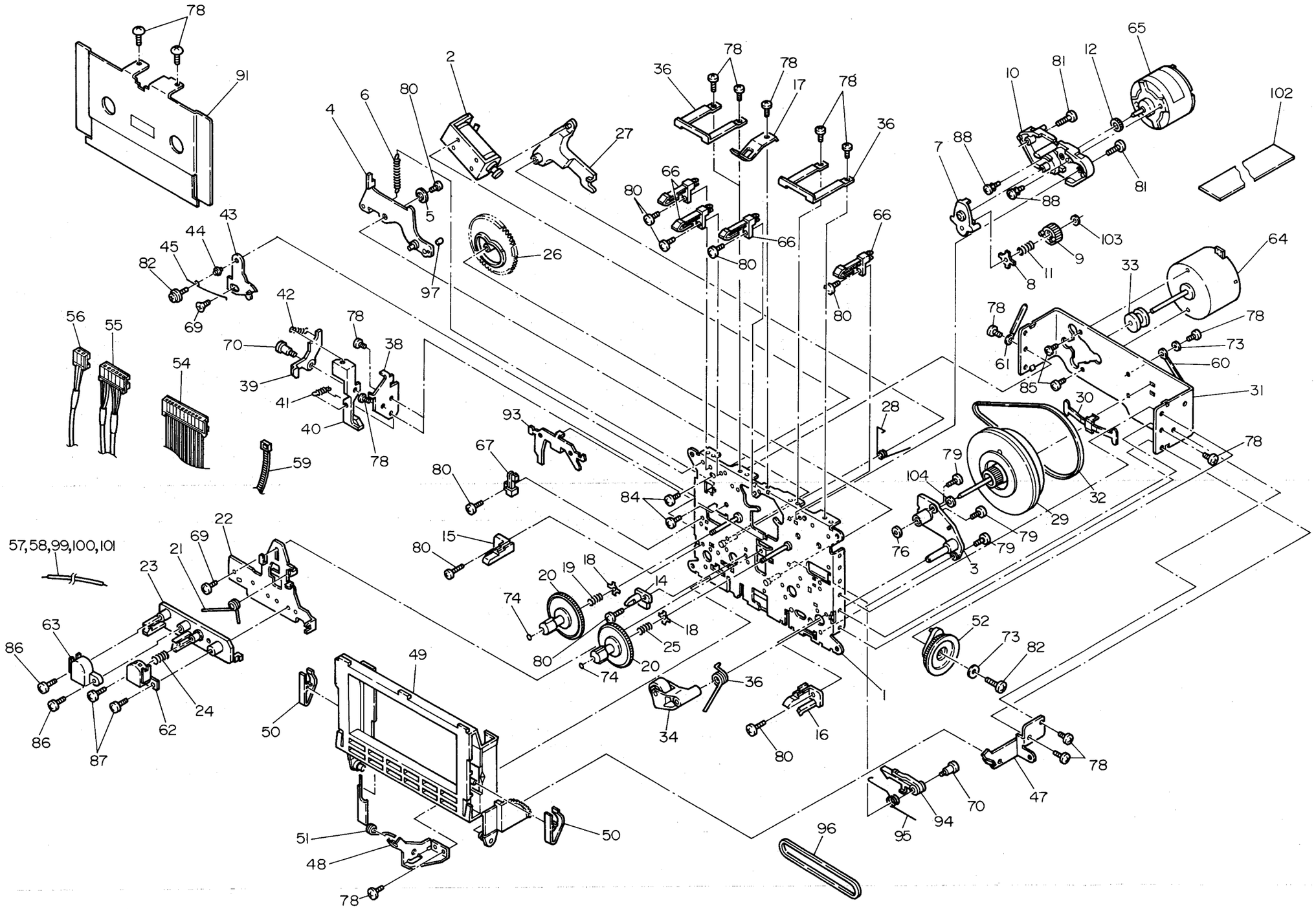
NOTE
(S) : Silver Model
(B) : Black Model

TAPE MECHANISM PART LIST

REF. NO.	PARTS NO.	DESCRIPTION
1	24611206	Chassis Ass'y (A)
2	24606244	Solenoid
3	24611207	Housing Ass'y (R)
4	24607048	Shift Arm Ass'y
5	24604077	Shift Arm Collar
6	24605604	Shift Arm Spring
7	24602370	Idler Arm Ass'y (7, 8, 9, 11, 103)
8	24611208	Idler Washer
9	24602362	Idler Gear
10	24611209	Idler Base
11	24605605	Clutch Spring
12	24602363	Motor Gear
14	24611210	Cassette Guide
15	24611211	Cassette Guide (L)
16	24611212	Cassette Guide (R)
17	24605606	Pack Spring
18	24611213	Reel Washer
19	24605607	Reel Spring
20	24602364	Reel Table
21	24605617	Head Chassis Spring (F)
22	24611214	Head Chassis (A)
23	24611215	Head Base
24	24605608	Head Spring
25	24605609	Reel Srping (C)
26	24602365	Play Gear
27	24607047	PL Arm
28	24605610	PL Arm Spring
29	24602366	Flywheel Ass'y
30	24604078	Capstan Spacer
31	24611216	Motor Holder (A)
32	24602367	Belt (A)
33	24602368	Motor Pulley (A)
34	24602369	Pinch Roller Ass'y (R)
35	24605611	Pinch Roller Spring (R)
36	24611217	SW Protector (B)
38	24611218	Eject Holder
39	24611219	Cassette Stopper
40	24611220	Ejector
41	24605612	Eject Spring (A)
42	24605613	Eject Spring (B)
43	24607050	Eject Lock Arm
44	24604079	Lock Arm Collar
45	24605614	Lock Arm Spring
47	24611221	Case Holder (R)
48	24611222	Case Holder (L)
49	24611223	Cassette Case
50	24611224	Cassette Clamp
51	24605615	Case Spring
52	24611225	Damper Ass'y
54	–	11P Wire Ass'y
55	–	6P Head Wire Ass'y
56	–	2P Head Wire Ass'y
57	–	Wire
58	–	Wire
59	24611226	Nylon Band
60	24611227	Cord Clamp
61	24611228	Cord Clamp
62	24600051	R/P Head
63	24600041	E Head
64	24601200	Motor Ass'y ((33) + (64))
65	24601201	Reel Motor Ass'y ((12) + (65))
66	24606245	Leaf Switch
67	24606246	Leaf Switch

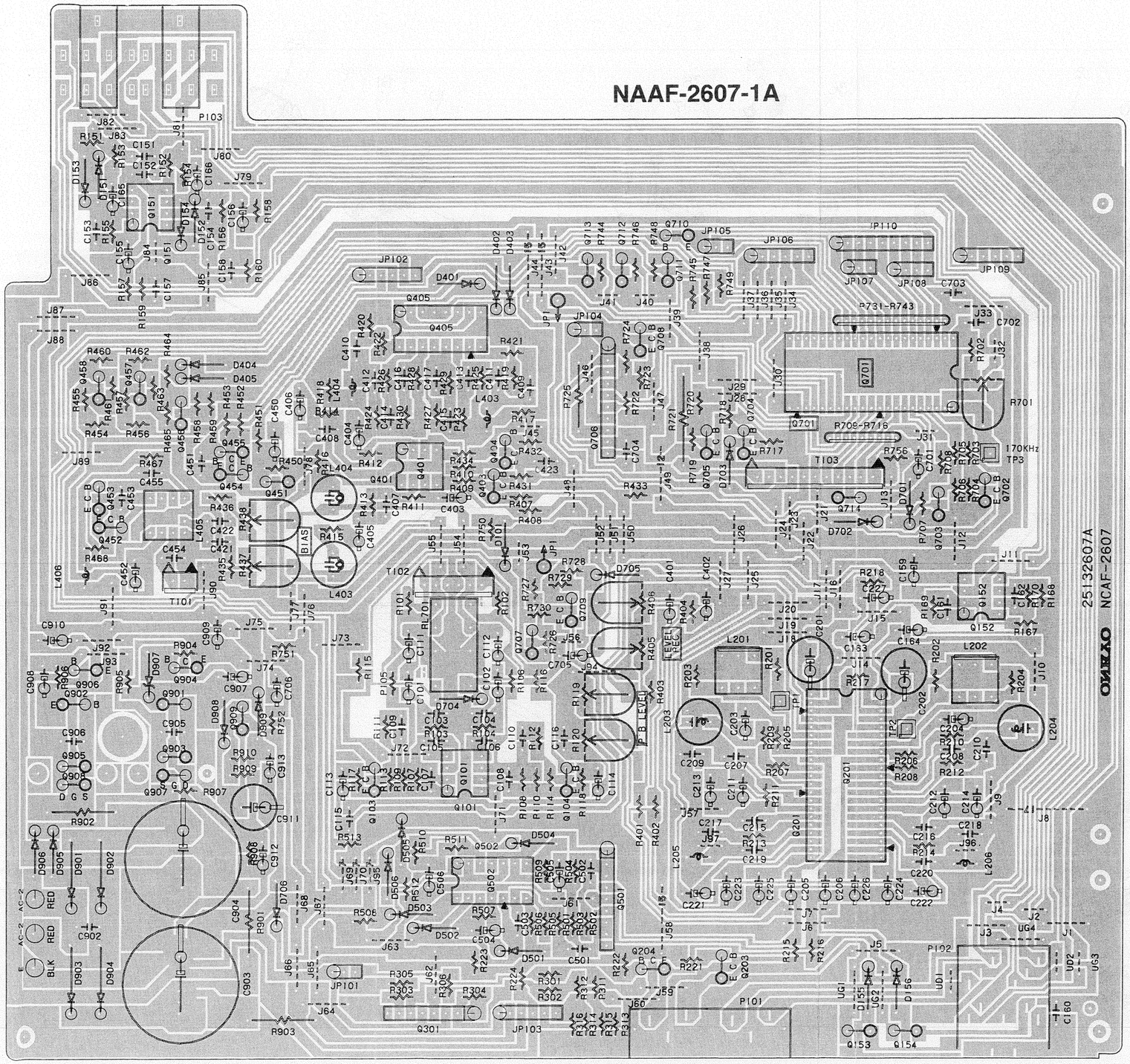
REF. NO.	PARTS NO.	DESCRIPTION
69	801367	Screw (A)
70	801368	Screw (B)
73	8771224303	Plain Washer (L) 2ϕ
74	24611229	Polyslider Washer 1.6 x 3.5 x 0.5t
76	24611230	Nylon Washer 1.9 x 5.0 x 0.5t
78	833120047	Tap Tite Screw (2 x 4)
79	838120047	Bind Tap Tite Screw (2 x 4)
80	833120057	Tap Tite Screw (2 x 5)
81	833120087	Tap Tite Screw (2 x 8)
82	833120107	Tap Tite Screw (2 x 10)
84	801369	Flat Screw (2.6 x 4)
85	82112604	Pan Screw (2.6 x 3)
86	82152012	Binding Screw (2 x 12)
87	801370	Washer Head Screw (2 x 10)
88	801371	Sems Screw (2.6 x 4)
91	24611205	Cassette Cover
93	24603333	Brake Lever (N)
94	24607051	Brake Arm
95	24605616	Brake Spring
96	24602360	Counter Belt
97	24604080	Shift Arm Collar
99	–	Wire
100	–	Wire
101	–	Wire
102	–	UL Tape
103	24611233	Polyslider Washer 1.7 x 3.5 x 0.5t
104	24611234	Polyslider Washer 2.1 x 6.8 x 0.4t

TAPE MECHANISM-EXPLODED VIEW

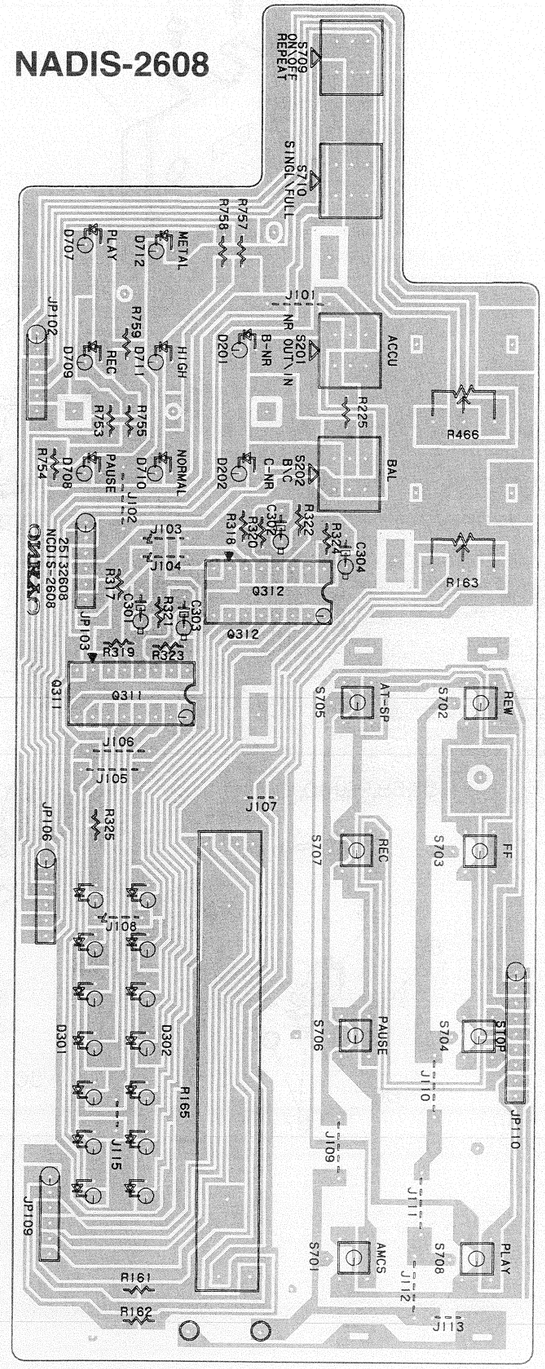


PC BOARD VIEW FROM BOTTOM SIDE

NAAF-2607-1A



NADIS-2608



PRINTED CIRCUIT BOARD-PARTS LIST

MAIN CIRCUIT PC BOARD (NAAF-2607-1A)

CIRCUIT NO.	PART NO.	DESCRIPTION
	ICs	
Q101	222956	NJM-2068D-D
Q151, Q152	222502	NJM-4558DX
Q201	222910	HA-12088
Q301	222652	M-5218L
Q401	222502	NJM-4558DX
Q501	222736	NJM-4558S
Q502	222681	IR3702
Q701	222955	LM6405L-1994
Q706	222775	BA6229
	Transistors	
Q103, Q104	2211255, 2212115, 2210746 or 2212485	2SC1815GR, 2SC2458GR, 2SC945AP or JC501Q
Q153, Q154	2211944 or 2212303	2SK246Y or 2SK381C
Q203, Q204	2212794, 2212795, 2211771 or 2211772	2SD1468R, 2SD1468S, 2SC2001K or 2SC2001L
Q403, Q404	2211255, 2212115, 2210746 or 2212485	2SC1815GR, 2SC2458GR, 2SC945AP or JC501Q
Q451	2211455 or 2212125	2SA1015GR or 2SA1048GR
Q452, Q453	2211544	2SC1959
Q454	2201593, 2201594 or 2201595	2SD1189P, 2SD1189Q or 2SD1189R
Q455-Q457	2211255, 2212115, 2210746 or 2212485	2SC1815GR, 2SC2458GR, 2SC945AP or JC501Q
Q702, Q703	2211454, 2212124, 2210804 or 2212449	2SA1015Y, 2SA1048Y, 2SA733AQ or JA101P
Q704, Q705	2212855, 2212853, 2212852, 2212846 or 2212845	2SB1068U, 2SB1068K, 2SB1068L, 2SB598F or 2SB598E
Q707	2211454, 2212124, 2210804 or 2212494	2SA1015Y, 2SA1048Y, 2SA733AQ or JA101P
Q708-Q710	2211255, 2212115, 2210746 or 2212485	2SC1815GR, 2SC2458GR, 2SC945AP or JC501Q
Q711-Q713	2211454, 2212124, 2210804 or 2212494	2SA1015Y, 2SA1048Y, 2SA733AQ or JA101P
Q714	221281	DTC-114YS
Q901	2201258 or 2201286	2SD882Q or 2SD882P
Q902	2201275 or 2201276	2SD772Q or 2SD772P
Q903, Q904	2211255, 2212115, 2210746 or 2212485	2SC1815GR, 2SC2458GR, 2SC945AP or JC501Q
Q905, Q906, Q909	2211454, 2212124, 2210804 or 2212494	2SA1015Y, 2SA1048Y, 2SA733AQ or JA101P
Q907, Q908	2211944 or 2212303	2SK246Y or 2SK381C
Q709	2211255, 2212115 or 2210746	2SC1815GR, 2SC2458GR or 2SC945AP
	Diodes	
D101, D151-D154	223150, 223124 or 223145	US1040, 1S2473 or 1S2076TD
D155, D156	223150, 223124 or 223145	US1040, 1S2473 or 1S2076TD
D401-D405, D501-D506, D701-D706	223150, 223124 or 223145	US1040, 1S2473 or 1S2076TD
D901-D904	22380005	1N4002
D905, D906, D908, D909	223150, 223124 or 223145	US1040, 1S2473 or 1S2076TD
D907	2239472, 2243152 or 2242824	RD5.6EB2, MTZ5.6B or EQA02-06A
	Coils	
L201, L202	233313 or 233306	NMC-6048 or NMC-6043
L203, L204	233245	NMC-2029
L205, L206	233188 or 231032	NCH-1033 or NCH-2072
L401, L402	24606072 or 231040	NCH-1010 or NCH-2080
L403, L404	233344 or 233314	NCH-2114 or NCH-2097
L405	231063	NLO-2037
L406	233188 or 231032	NCH-1033 or NCH-2072
	Capacitors	
C111, C112	352731019	100μF, 10V, Elect.
C113, C114	352780229	2.2μF, 50V, Elect.
C155, C156	352780109	1μF, 50V, Elect.
C159	352742209	22μF, 16V, Elect.
C163, C164	352780109	1μF, 50V, Elect.
C165, C166	352741009	10μF, 16V, Elect.
C168	352780109	1μF, 50V, Elect.
C201, C202	352734719	470μF, 10V, Elect.
C203-C206	352741009	10μF, 16V, Elect.
C211, C212	352786899	0.68μF, 50V, Elect.
C213, C214	352780229	2.2μF, 50V, Elect.
C221, C222	352786899	0.68μF, 50V, Elect.
C223, C224	352780229	2.2μF, 50V, Elect.
C225, C226	352741009	10μF, 16V, Elect.
C227	352742209	22μF, 16V, Elect.
C228	352984796	0.47μF, 50V, NP.
C401, C402	352786899	0.68μF, 50V, Elect.
C403, C404	352742209	22μF, 16V, Elect.
C405, C406	352750479	4.7μF, 25V, Elect.
C450	352731019	100μF, 10V, Elect.
C452	352741009	10μF, 16V, Elect.
C454	370131234	0.12μF, 100V, APS
C504	352780109	1μF, 50V, Elect.
C505	352781099	0.1μF, 50V, Elect.
C506	352741009	10μF, 16V, Elect.
C701	352780229	2.2μF, 50V, Elect.
C705	352780109	1μF, 50V, Elect.
C706	352781099	0.1μF, 50V, Elect.
C707	352942206	22μF, 50V, NP.
C903, C904	3504195	4700μF, 25V, Elect.
C907	352781099	0.1μF, 50V, Elect.
C908	352741009	10μF, 16V, Elect.
C909, C910	352731019	100μF, 10V, Elect.
C911	352734719	470μF, 10V, Elect.
C912	352750479	4.7μF, 25V, Elect.
C913	352742209	22μF, 16V, Elect.
	Resistors	
R119, R120, R405, R406	5215045 or 5215021	N08HR10kBC, Semi-fixed
R437, R438	5215024 or 5215047	N08HR100kBC, Semi-fixed
R701	5215003	N08HR20kBC, Semi-fixed
R709-R716	49163392408	3.9kΩx8, 1/10W, Network
R731-R743	49163392413	3.9kΩx13, 1/10W, Network
R721	441723904	39Ω, 2W, Oxidefilm
R725	441522204	22Ω, 1/2W, Oxidefilm
R901, R902	441520104	1Ω, 1/2W, Oxidefilm
R903	441522704	27Ω, 1/2W, Oxidefilm
	Terminals	
P101	25045142	NPJ4PDBL55, Input/output
P102	25050064	NSCT-5P18, DIN
P103	25045195	HLJ-4337-01-3010
JP110	25050273	NSCT-9P101, Socket
	Plugs	
T101	25055132	NPLG-2P-116
T102	25055136	NPLG-6P-120
T103	25055146	NPLG-11P-125
	Relay	
RL701	25065174	NRL-2P1A-DC12-09
	Radiator	
	27160029-1	RAD-07B
	27150211	Shield plate

DISPLAY PC BOARD (NADIS-2608-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
	IC	
Q311, Q312	222623	IR2E02
	LEDs	
D201, D202	225178	GL3HY18
D301, D302	225159	SEL9720HB01
D707	225179	GL3NG28
D708, D709	225177	GL3PR28
D710-D712	225179	GL3NG28
	Capacitors	
C301, C302	353750479	4.7μF, 25V, (S), Elect.
C303, C304	353780109	1μF, 50V, (S), Elect.
	Resistors	
R163	5104182	N16RMC250kW20Z, Variable
R165, R166	6172001	N60LGL50A5Z, Variable
R466	5104181	N16RMC2kB20Z, Variable
	Switch	
S201, S202, S709, S710	25035399	NPS-122-L364
S701-S708	25035389	NPS-111-5353
	Holder	
	27190444	Holder (LED-8)

TIMER SWITCH PC BOARD (NASW-2609-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
S711	25065224	NSS-2398, Timer switch

POWER SWITCH PC BOARD (NASW-2610-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
C901	3500065A	DE7150FZ 0.01μF, AC400V, IS
S901	25035375	NPS-111-139P, Power switch

HEADPHONE TERMINAL PC BOARD (NAHP-2611-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
P110	25045139	HLJ-0540-01-010 (S)
	25045187	HLJ-0541-01-010 (B)

HALL IC PC BOARD (NATD-2612-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
Q715	222558 or 222470	DN6838 or DN838K, Hall IC
	27190173 or 27190251	Holder (DN6838) or Spacer (DN838K)

NOTE
(S) : Silver model
(B) : Black model

ADJUSTMENT PROCEDURES

PRECAUTIONS

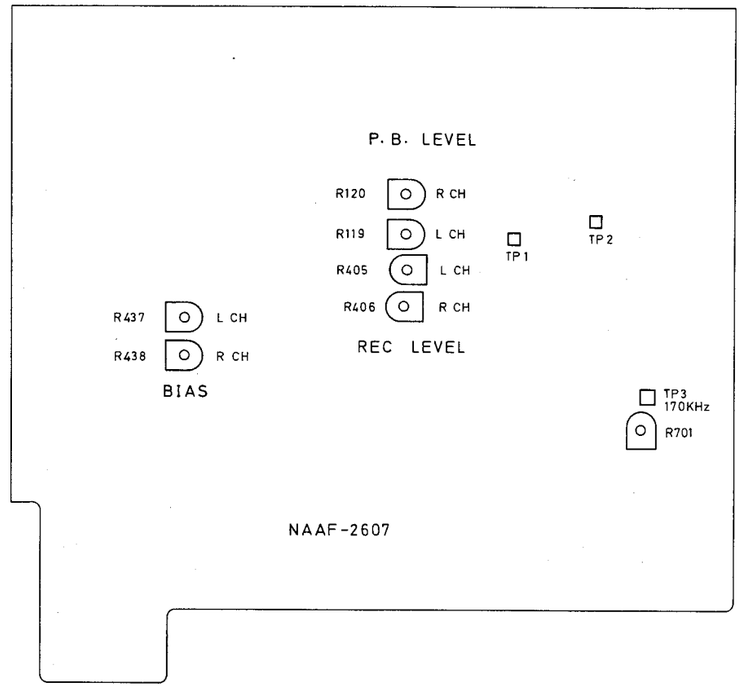
1. Before adjustment, clean the following parts with an alchol moinstend swab.
   * record/playback head * erase head
   * pinch roller * capstan
2. Do not use magnetized screwdriver for adjustments.
3. Demagnetize record/playback head with a head demagnetizer.

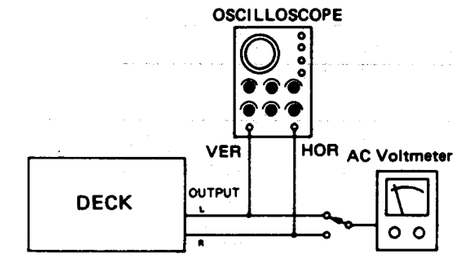
TEST EQUIPMENT/TOOLS REQUIRED:

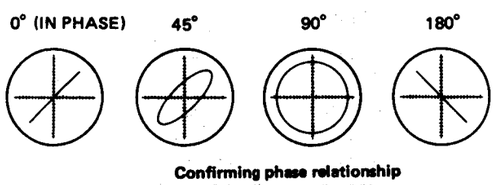
Audio oscillator
Digital frequency counter
Oscilloscope
Attenuator
AC voltmeter
Non-magnetic screw driver
Blank tapes (completely erased)
NORMAL . . . . . NEW UD90
HIGH . . . . . NEW XL-II90
METAL . . . . . NEW MX60
Test tapes
VTT-658 : 10 KHz, –15dB
MTT-111 : 3 kHz, –10dB
MTT-150 : Dolby level calibration 400Hz, tone 200nWb/m

	Item	Connection of Instrument	Line input	Test tape	Mode	Output indicator	Adjustment point	Adjust	Remarks
1	Tape speed	Frequency counter to LINE output terminal		MTT-111	PB	Frequency counter	Semi-fixed on the motor	3,010 to 3,020Hz	
2	Head azimuth	AC voltmeter and oscilloscope to LINE output terminal		VTT-658	PB	AC voltmeter	Head azimurth screw	Maximum and same phase at channels L and R	See fig. 1
3	Playback level	AC v oltmeter to terminals TP-1 and TP-2		MTT-150	PB	AC voltmeter	R-119 (Ch. L) R-120 (Ch. R)	300mV	
4	Bias current	Fig. 2	1KHz, –20dB and 12KHz, –20dB	NEW XL-II90	REC/PB	AC voltmeter	R-437 (Ch. L) R-438 (Ch. R)	Same level at REC/PB	accu VR center position Input VR maximum
5	Record level	Fig. 2	1 KHz		REC PAUSE REC/PB	AC voltmeter AC voltmeter	Attemator or AF OSC output R-405 (Ch. L) R-406 (Ch. R)	350mV Same level at REC/PB	accu VR center position
6	Clock Frequency	Frequency counter to terminal TP-3 Fig. 3				Frequency counter	R-701	170KHz±5KHz	

PLAY torque . . . . . 30 ~ 75 g/cm
FF. REW torque . . . . . 70 ~ 170 g/cm







Confirming phase relationship

fig-1

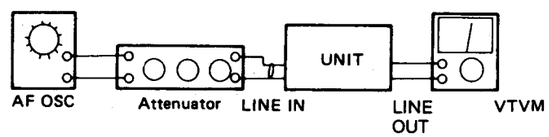


fig-2

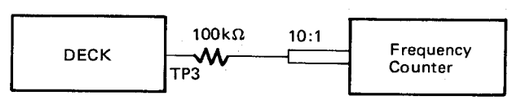
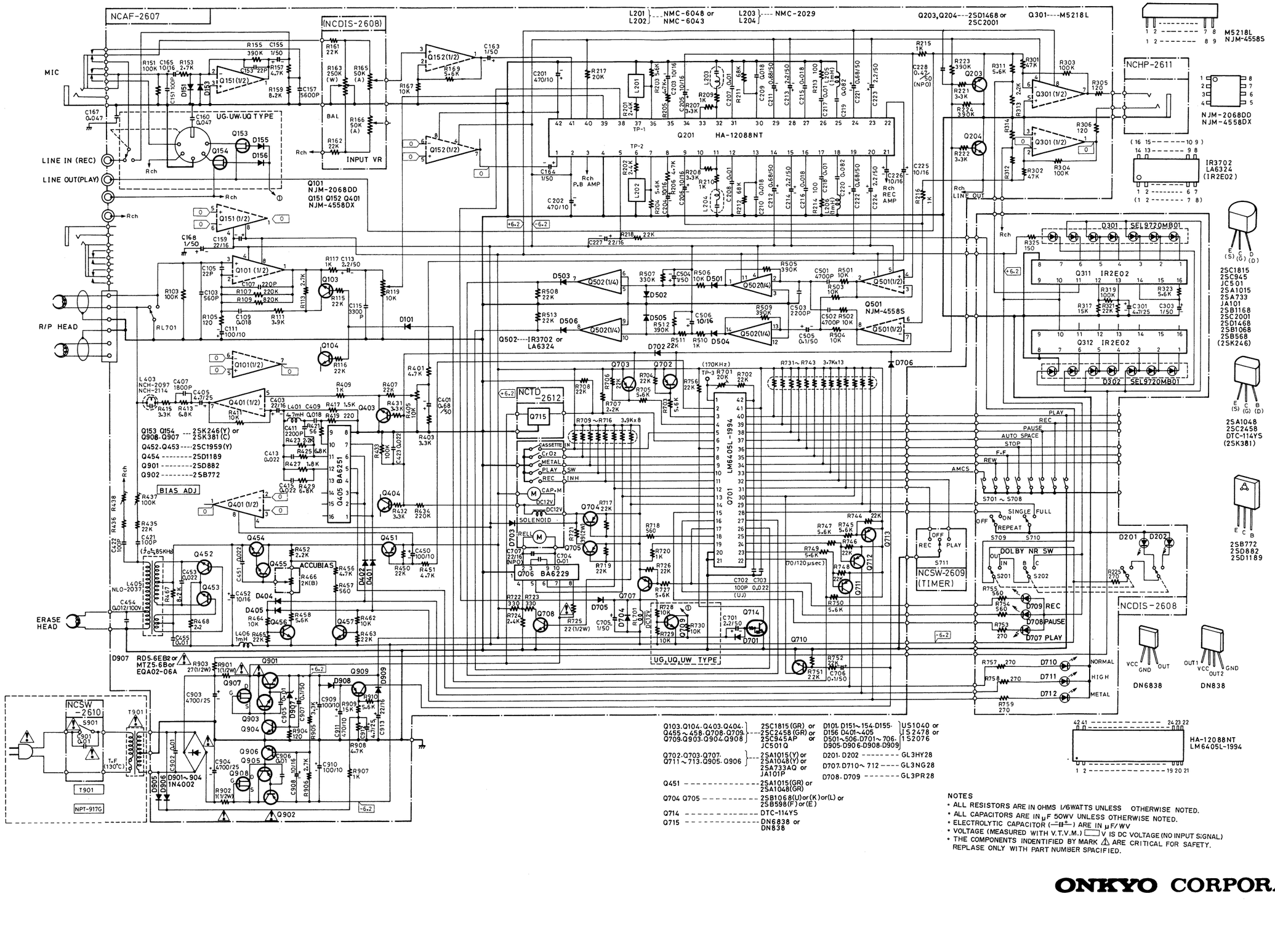


fig. 3

SCHEMATIC DIAGRAM



Q153 Q154 --- 2SK246(Y) or 2SK381(C)
Q908·Q907
Q452·Q453----2SC1959(Y)
Q454 --------2SD1189
Q901 --------2SD882
Q902 --------2SB772

Q103·Q104·Q403·Q404·Q455~458·Q708·Q709·Q709·Q903·Q904·Q908 --- 2SC1815(GR) or 2SC2458(GR) or 2SC945AP or JC501Q

Q702·Q703·Q707·Q711~713·Q905·Q906 --- 2SA1015(Y) or 2SA1048(Y) or 2SA733AQ or JA101P

Q451 --- 2SA1015(GR) or 2SA1048(GR)

Q704 Q705 --- 2SB1068(U) or (K) or (L) or 2SB598(F) or (E)

Q714 --- DTC-114YS

Q715 --- DN6838 or DN838

D101·D151~154·D155·D156 D401~405 D501~506·D701~706·D905·D906·D908·D909 --- US1040 or IS2478 or 1S2076

D201·D202 --- GL3HY28

D707·D710~712 --- GL3NG28

D708·D709 --- GL3PR28

NOTES
- ALL RESISTORS ARE IN OHMS 1/6WATTS UNLESS OTHERWISE NOTED.
- ALL CAPACITORS ARE IN μF 50WV UNLESS OTHERWISE NOTED.
- ELECTROLYTIC CAPACITOR (⊕⊖) ARE IN μF/WV
- VOLTAGE (MEASURED WITH V.T.V.M.) ☐ V IS DC VOLTAGE (NO INPUT SIGNAL)
- THE COMPONENTS INDENTIFIED BY MARK ⚠ ARE CRITICAL FOR SAFETY. REPLASE ONLY WITH PART NUMBER SPACIFIED.

ONKYO CORPORATION